

The Changing Face of Minnesota Manufacturing

Most manufacturing sectors in the state have seen some employment growth since 2009, but some are doing better than others as the industry evolves.

Manufacturing comprises a diverse set of industries that are constantly in flux. Where assembly line workers in factories once were the norm, innovations like 3D printing and sophisticated machinery are changing manufacturing. Furthermore, wages and working conditions vary widely within the sector. Food manufacturing generally is a low-wage and low-skill sector, while medical device manufacturing requires higher skills and offers better pay.

Manufacturing has made up a declining share of employment in Minnesota and nationally over the last several decades. The industry saw little of the massive employment gains in the 1990s and experienced steeper declines than overall employment in both the 2001 and 2007 recessions. Although manufacturing has been adding jobs in the current recovery, the industry is unlikely to regain its prerecession peak much less its overall peak (see Figure 1).

These trends haven't hit all manufacturing industries evenly, though. Some industries have seen employment grow, some have stayed steady and others have plummeted much faster than the sector as a whole. Further investigation can help us understand more about the switch to the "service economy" and how not just the number but the types of available manufacturing jobs are changing.

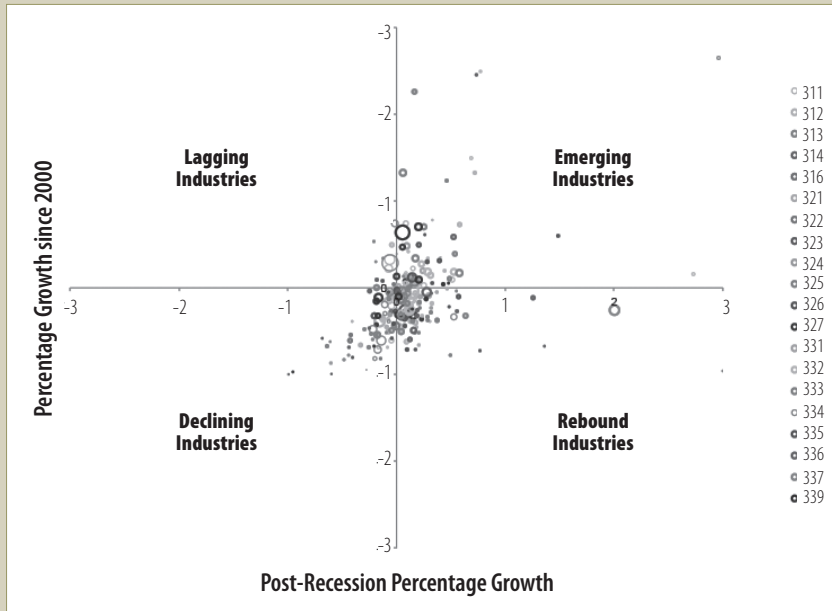


FIGURE 1



FIGURE 2

Scatter Plot of Manufacturing Industry Employment Trends, 2000 to 2013



Source: QCEW 2000, 2009, 2013 Annual, MN LMI

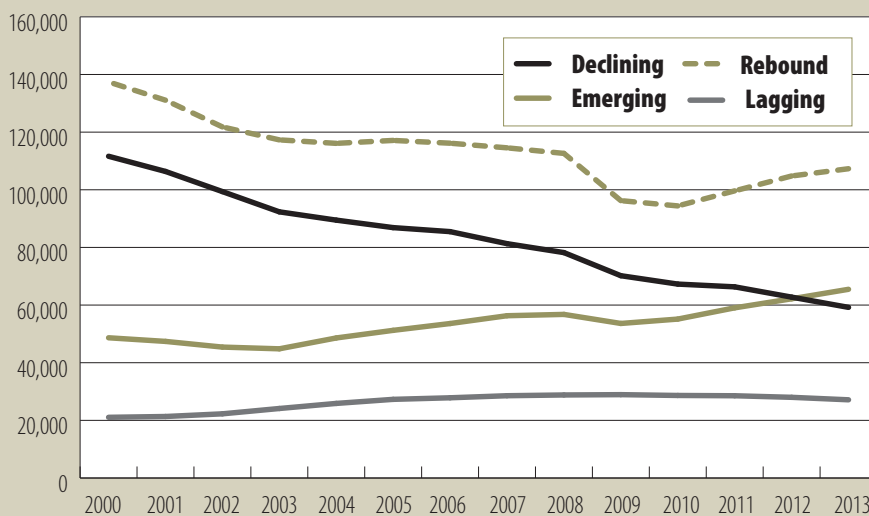
Note: Color indicates three-digit NAICS category. No single three-digit NAICS dominates any quadrant.

Process and Methods

In Minnesota, the manufacturing industries that are faring well are shifting the sector away from our traditional mix. This analysis calculated employment change since 2000 and since the recession ended in 2009 for each detailed (six-digit NAICS) manufacturing industry. The results are displayed on a scatter plot (see Figure 2) and divided into four groups. “Emerging Industries” grew both since the recession started and since 2000. “Declining Industries” declined in both time periods. “Rebound Industries” grew since the recession but are still at lower levels than in 2000. “Lagging Industries” grew since 2000 but are still below their recession levels.

FIGURE 3

Employment by Group



Source: QCEW data, MN LMI

The overall growth trend is apparent. Although clustered around no change, most manufacturing industries have seen some employment growth since 2009, with some significant outliers in the positive territory (including some not displayed because they're off the axis). Most outliers are small or mid-size industries.

Lagging Industries are the rarest. Most industries that are suffering now were already on a downward trajectory that picked up pace during the recessions. Generally, employment in Lagging Industries is more stable with fairly flat employment trends.

Characteristics of Industry Groups

The industries in each group vary dramatically on a number of characteristics. By examining trends separately, we can get a sense of what kind of firms are growing or declining and a hint at why.

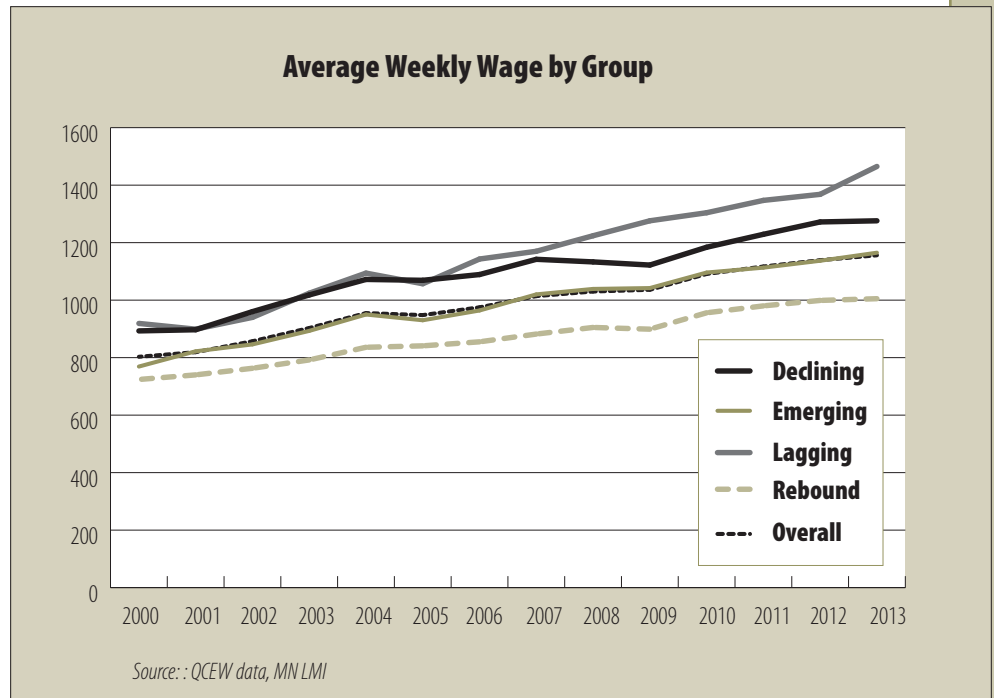
Number Employed in Manufacturing

Declining and Rebound Industries make up a majority of employment overall and share a pre-recession downward trend (see Figure 3). Rebound Industries, however, have grown enough to reach 2007 employment levels. The declines since 2000 happened between 2000 and 2007, mostly during the recession in 2001. The pace of decline in Declining Industries has been steady, down 40,000 jobs since 2000.

Emerging Industries have been on a similarly steady growth trajectory, with growth beginning after the 2001 recession and only stumbling in 2007. The pace and overall number of jobs has been much slower and smaller, however.

Lagging Industries are characterized by much less overall change. They have relatively few jobs in the state and tend to be concentrated in medical device firms in the Twin Cities.

FIGURE 4



The fastest pace of growth and most new/returning jobs since the recession come from Rebound Industries.

Wages in Manufacturing

These trends are particularly concerning when we look at wages (see Figure 4). Lagging and Declining Industries have the highest wages, so the best-paid jobs in manufacturing are making up a smaller and smaller share of the total.

Emerging Industries are right in the middle on wages, while wages for Rebound Industries lag the average by a steadily increasing gap — \$80 per week in 2000 to \$150 per week in

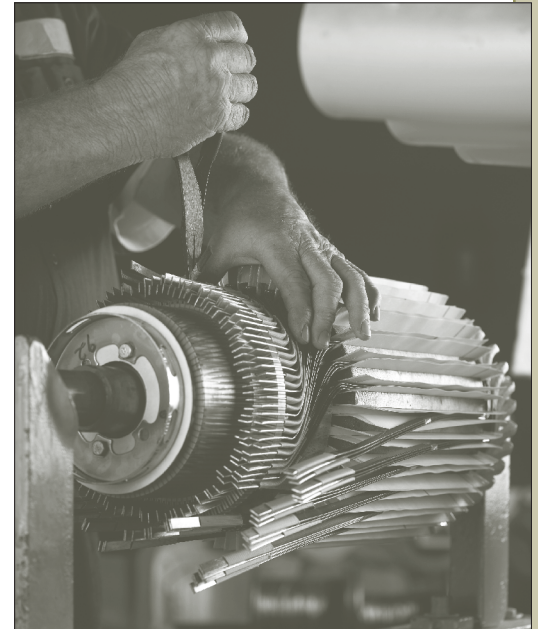
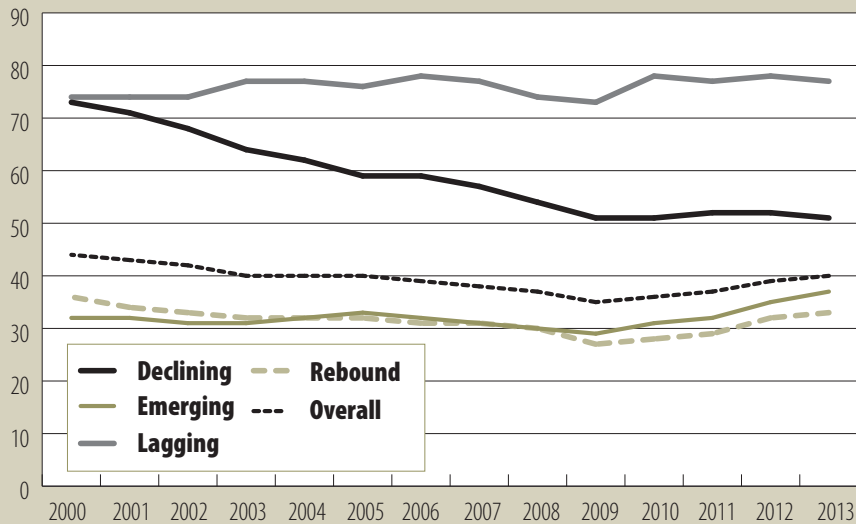


FIGURE 5

Average Firm Size by Group



Source: QCEW data, MN LMI

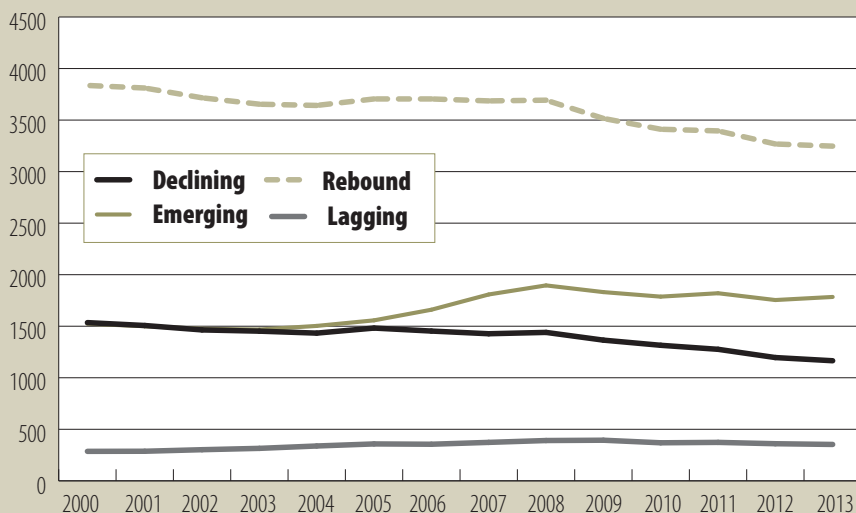
2013. Overall, this means that most of the manufacturing jobs that have returned since the recession pay well below the jobs they've replaced.

Firm Size and Number in Manufacturing

The size of a firm also can be relevant to the types of jobs it provides. Larger firms often allow more specialization in jobs, and economies of scale make them more likely to provide good benefits. Smaller firms can be more flexible and responsive to change. Average firm size has changed since 2000 as well (see Figure 5).

FIGURE 6

Number of Firms by Group



Source: QCEW data, MN LMI

Lagging Industries are the largest on average and most consistent in size since 2000, likely the same firms with stable employment over this time. Declining Industries are large but shrinking, likely due to layoffs not closures. The Emerging and Rebound groups are made up of small but growing firms. Overall, new firms are small but growing, while larger, established firms are shrinking.

Overall, Rebound and Declining firms are closing (see Figure 6), although the Rebound firms that remain are growing in size. Employment growth in Rebound Industries is likely coming from expansion and consolidation.

TABLE 1

Percent of Employment by Geography and Category (Using Pre-2013 Metro Definitions)					
	Declining	Emerging	Lagging	Rebound	Overall
Metro	67.9%	74.8%	78.1%	65.1%	69.5%
Micro	17.4%	13.3%	15.2%	21.1%	17.7%
Rural	14.7%	11.9%	6.7%	13.8%	12.8%
MSP	48.5%	65.0%	68.4%	50.7%	55.6%
Non-MSP	51.5%	35.0%	31.6%	49.3%	44.4%

Source: QCEW 2000, 2009, 2013 Annual, MN LMI

The number of Lagging firms is stable, while the number of Emerging firms was growing until the recession but has since dropped slightly. New firms might be the next area of growth in manufacturing as confidence in the economy improves.

(6.7 percent, compared with 12.8 percent of manufacturing jobs overall).

Lagging Industries are stable and established, and they tend to be centered in the Minneapolis-St Paul-Bloomington MSA (11-county area). Emerging

Industries — largely new and small firms — also are largely within the Twin Cities MSA. Job creation in manufacturing is happening in the core cities. Declining Industries tend to be more rural and further from the metros.

Geography by Group

The geographic dispersion of manufacturing employment varies by growth category as well (see Table 1). Lagging Industries (78.1 percent) are largely in the metros (including St Cloud, Duluth, Rochester, Mankato, Fargo and Grand Forks). Rebound Industries are disproportionately represented (21.1 percent) in micropolitan areas, which account for 17.7 percent of all manufacturing jobs in the state. Emerging Industries are disproportionately not in micropolitan areas (13.3 percent). Lagging Industries are under-represented in rural areas



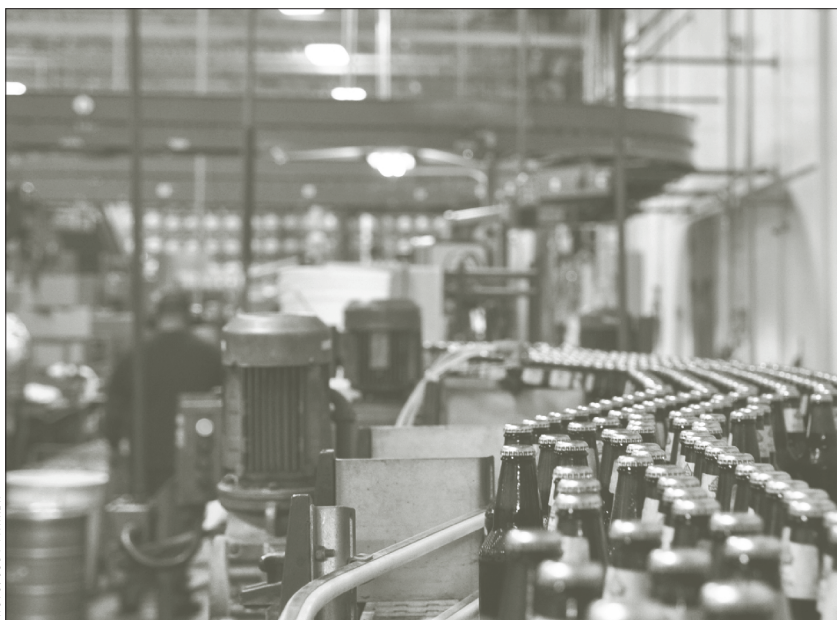


PHOTO: JUDY PARKER

TABLE 2

Top 15 Declining Industries (Excluding Industries Smaller Than 20 in 2013)		
Industry	2013 Employment	Percent Change 2009-2013
Mineral Wool Manufacturing	21	-95.2
Paint and Coating Manufacturing	263	-63.6
Asphalt Paving Mixture and Block	88	-60.2
Electronic Coils, Transformer and Inductor	258	-47.9
Railroad Rolling Stock Manufacturing	88	-44.0
Audio and Visual Equipment Manufacturing	208	-43.8
Folding Paperboard Box Manufacturing	641	-43.1
Newsprint Mills	279	-41.9
Roasted Nuts and Peanut Butter Manufacturing	158	-41.3
Noncurrent-Carrying Wiring Devices	46	-40.3
Reconstituted Wood Product Manufacturing	434	-33.2
Industrial Process Furnaces and Ovens	200	-29.8
Aircraft Engine and Engine Parts	83	-25.2
Photographic Film and Chemicals	283	-25.1
Aircraft Manufacturing	422	-25.0

Source: QCEW 2000, 2009, 2013 Annual, MN LMI

Detailed Industries by Group

Over the long term, manufacturing employment in Minnesota is declining. The decline is driven by certain industries. Others are growing, but it's difficult to get a clear view of patterns from the detailed industries because there are many of them and they are small. An industry with 20 employees can double with little overall impact, but significant patterns can be missed if individual small industries are ignored. To counter these challenges, a large number of industries was sorted by percentage change.

Declining Industries comprise a broad mix of manufacturers, including construction products, high tech consumer products and aircraft (highlighted in Table 2).

Emerging Industries tend to produce supply-chain industrial products, including metal processing and motor vehicle parts, rather than products for retail sale. The exception seems to be in food products. A disproportionate number of food and beverage production industries are represented in this group (highlighted in Table 3). Many of these — tea, beer, wine, liquor — are likely specialty luxury goods that serve a niche market without much potential for huge growth.

Lagging Industries include more complex and high-tech manufacturing, including medical device firms (highlighted in Table 4). All industries in this small group are listed in the table.

Rebound Industries have a lot of heavy machinery and disproportionately include industries that manufacture vehicles and vehicle parts (highlighted in Table 5).

Location Quotient Analysis

Location quotients (LQs), which measure employment concentration, were calculated as the share of all manufacturing in Minnesota relative to the rest of the country. Industries with a 2009-2013 change in LQ of 0.3 or higher were selected. Not all industries matched up. Some had unpublished U.S. values or missing years that made LQ calculations impossible, so this analysis is not exhaustive. LQ tables are published in the online version of this story at www.mn.gov/deed/trends.

What stands out about LQs is how little they have changed even in industries that have grown or declined a lot since 2009. When the LQ doesn't change much, it means that the industry is growing or declining locally at about the same pace as nationally.

TABLE 3

Top 20 Emerging Industries		
Industry	2013 Employment	Percent change 2009-2013
Secondary Processing, Other Nonferrous	263	592.1
Electronic Connector Manufacturing	511	296.1
Frozen Pastry Manufacturing	433	273.3
Tire Retreading	174	148.6
Dried and Dehydrated Food Manufacturing	429	142.4
Wineries	199	134.1
Misc. Nonmetallic Mineral Products Manufacturing	504	115.4
Mattress Manufacturing	585	110.4
Coffee and Tea Manufacturing	266	77.3
Motor Vehicle Steering/Suspension Parts	90	73.1
Distilleries	284	72.1
Tortilla Manufacturing	409	68.3
Breweries	571	58.2
Industrial Mold Manufacturing	1,968	57.3
Adhesive Manufacturing	723	54.2
Small Arms Ammunition Manufacturing	1,715	53.0
Truck Trailer Manufacturing	894	52.6
Fluid Milk Manufacturing	1,139	51.7
Fasteners, Buttons, Needles, and Pins	67	48.9
Optical Instrument and Lens Manufacturing	579	48.5

Source: QCEW 2000, 2009, 2013 Annual, MN LMI

In Declining Industries, the significant declines were in computer storage device and cheese manufacturing, but both were still more concentrated here than nationally. Leather hide tanning and finishing increased LQ despite declines overall, but that's a very small industry.

In Emerging Industries most LQs increased, which makes sense since these were selected

for growth. The most significant changes were in motor and generator manufacturing (up 0.6) and in all other miscellaneous food manufacturing (down 0.6).

Lagging Industries saw no significant LQ changes, in keeping with their constant employment patterns.

A few Rebound Industries saw significant increases: all other

transportation equipment, metal household furniture manufacturing, fluid power pump and motor manufacturing. Vehicle-related manufacturing seems to be growing significantly compared with the rest of the country with the most significant and positive shifts in LQ.

Conclusions

Manufacturing employment is on a long decline, taking with it an entire class of skilled labor. The jobs that remain and that have been growing since the recession are changing shape as well. Firms are getting smaller, and newly added jobs tend to pay less because growth trends are favoring lower-paying industries.

Growing industries are largely unrelated to declining industries. Manufacturing construction products is dramatically different from distilling liquor, and medical device workers might not be well suited for jobs producing motor homes.

The location of firms is changing, too. New growth is occurring outside of the metro areas, leaving many workers with fewer options close to home. The pace of change is relatively slow, and workers likely are adapting. ■

TABLE 4

Lagging Industries		
Industry	2013 Employment	Percent change 2009-2013
Irradiation Apparatus Manufacturing	25	0.0
Cut Stone and Stone Product Manufacturing	1,407	-0.3
Printed Circuit Assemblies	2,126	-1.0
Paperboard Mills	181	-2.2
Industrial Valve Manufacturing	647	-4.0
Electromedical Apparatus Manufacturing	12,898	-5.5
Animal (Except Poultry) Slaughtering	5,121	-6.3
Commercial Bakeries	2,898	-7.4
Agricultural Chemicals Except Fertilizer	43	-12.2
Plastics Packaging Film and Sheet	165	-13.2
Other Aircraft Parts and Equipment	233	-18.3
Pharmaceutical Preparation Manufacturing	1,163	-18.6
Magnetic and Optical Media Manufacturing	160	-19.2
Power-Driven Handtool Manufacturing	63	-21.3

Source: QCEW 2000, 2009, 2013 Annual, MN LMI

TABLE 5

Top 15 Rebound Industries		
Industry	2013 Employment	Percent change 2009-2013
Travel Trailer and Camper Manufacturing	509	125.2
Metal Household Furniture Manufacturing	392	87.6
Fluid Power Pump and Motor Manufacturing	868	63.5
Mechanical Rubber Product Manufacturing	528	57.1
Motor Vehicle Metal Stamping	197	55.1
Custom Architectural Woodwork and Millwork	501	52.7
Semiconductor and Related Devices	1,764	52.2
Welding and Soldering Equipment Manufacturing	118	49.4
Hardwood Veneer and Plywood Manufacturing	88	46.7
Analytical Laboratory Instruments	241	37.7
Machine Tool Cutters and Accessories	547	37.4
Secondary Smelting/Alloying of Aluminum	133	37.1
Bolts, Nuts, Screws, Rivets, and Washers	309	32.6
Petroleum Lubricating Oil and Grease	132	32.0
Mechanical Power Transmission Equipment	238	31.5

Source: QCEW 2000, 2009, 2013 Annual, MN LMI